Perceptual and Motor Skills 1993, 76, 444-446. © Perceptual and Motor Skills 1993

AVERAGE DIURNAL CHANGES IN MELATONIN LEVELS ARE ASSOCIATED WITH HOURLY INCIDENCE OF BEREAVEMENT APPARITIONS: SUPPORT FOR THE HYPOTHESIS OF TEMPORAL (LIMBIC) LOBE MICROSEIZURING [1]

M. A. PERSINGER

Laurentian University

Summary.—Transient suppressions of nocturnal melatonin levels due to enhanced geomagnetic activity have been suggested as the precipitating source of experiences of postmortem (bereavement) apparitions when the brain has been sensitized (grief) by elevations of the epileptogenic neuropeptide, corticotrophin-releasing factor. Although the hourly incidence of subjective experiences of telepathy, precognition, and bereavement apparitions were all significantly correlated with published indices of hourly melatonin levels, only the significant association between melatonin levels and apparitions was not changed when the other two classes of psi experiences were held constant.

Analyses of both spontaneous and experimental cases of psi phenomena strongly indicate more than one source of variance (4). Traditionally, overinclusion of these phenomena under a single label (and implying the same mechanism) may have contributed to the confusion and contradiction that characterize this domain of human behavior. Whereas telepathic experiences concerning death or crisis to significant others occur during periods when the geomagnetic activity is quieter (than on previous or subsequent days), experiences of postmortem apparitions (bereavement hallucinations) are more likely to occur when there is a significant increase in geomagnetic activity (3, 5). This empirical relationship emphasizes the pursuit of the potential neuromechanisms of these experiences as behavioral phenomena rather than the philosophical obsession with issues concerning "real" and "not real" or believers and nonbelievers.

One hypothesis (3) states that postmortem apparitions, most of which occur within three days of the death of a significant person, are encouraged by geomagnetic activity-induced suppression of the (normal) elevated levels of circulating nocturnal melatonin. The additional reduction of the endogenous anticonvulsant derivative of serotonin (which normally decreases during rapid eye movement, i.e., dream, sleep), within a brain whose limbic electrical thresholds have been lowered already by the epileptogenic (6) corticotrophin-releasing factor (CRF) and other neuropeptides that are correlative with grief, would facilitate microseizure activity. Consequently the apparitions should be experienced as real and should occur primarily during the normal

[1]Please send reprint requests to Dr. M. A. Persinger, Behavioral Neuroscience Laboratory, Department of Psychology, Laurentian University, Sudbury, Ontario P3E 2C6, Canada.

peak in nocturnal melatonin levels, i.e., midnight to 0600 local time; during this period about 53% to 55% of the total diurnal amount is released (1).

However, most spontaneous psi experiences occur at night; in the *Fate Magazine* collection (2) 39% of the cases of telepathy, 37% of the cases of precognition and 54% of the cases of postmortem apparitions occurred within the 6-hr. period between midnight and 0600 hr. local time. To test the hypothesis that these apparitions are specifically associated with the nocturnal period when melatonin is maximally elevated (and hence geomagnetic activity would evoke the greatest suppression and microseizures), all cases for which the specific hour of occurrence was specified were extracted from the primary data base: the total numbers of cases were telepathy ($n = 141/232$), precognition ($n = 52/186$), and postmortem apparitions ($n = 51/203$). A chi squared (77.17, $df = 2$, $p < .001$; $phi = 0.35$) indicated a significant class difference due primarily to the greater proportion of telepathy cases that contained specific hours compared to cases of precognition and postmortem apparitions. Estimates for the mean level of plasma melatonin levels (pg/ml) per hour (normal people who retired at 2300 hr.) were also determined from published tables and figures (1).

All analyses involved SPSS software on a VAX 4000 computer. Because both nonparametric (Spearman) and parametric (Pearson) correlations were comparable, the latter are reported ($r > 0.40$, $p < .05$). The following intercorrelations were noted: postmortem apparitions-telepathy (0.57), postmortem apparitions-precognition (0.52), telepathy-precognition (0.69), postmortem apparitions-melatonin (0.65), telepathy-melatonin (0.54), and precognition-melatonin (0.42). Partial correlation between melatonin and postmortem apparitions with either telepathy (0.48), precognition (0.49) or both (0.48) held constant did not significantly alter the hourly association between numbers of postmortem apparitions and melatonin levels. However, when these experiences were held constant, the correlations between melatonin and telepathy (0.27) and precognition (0.12) were no longer statistically significant.

Lag analyses, which allowed values of each category of psi experiences and the melatonin levels to be shifted in hourly intervals (cases) between ± 3 hr. ("forward" lags were obtained by determining the coefficients between lag 3 for a variable and lags 0 through 2 for the comparison variable), gave coefficients of 0.52, 0.41, and 0.09 between melatonin levels and the occurrence of postmortem apparitions (lagged) during the previous hours, and coefficients of 0.54, 0.40, and 0.13 between postmortem apparitions and melatonin (lagged) during the previous hours. All other lag correlations with the other two classes were not statistically significant.

These results are consistent with the hypothesis that the phenomenon labeled "bereavement apparitions" is associated with suppressions of nocturnal melatonin levels and also support the general hypothesis that different psi

experiences involve different neurochemical processes. For example, spontaneous psi experiences that occur temporally contiguous (traditional telepathy-clairvoyant responses) with death/crisis stimuli exhibit a secondary enhancement around 1600 hr. (local time). This pattern is similar to the primary and secondary peaks in serum prolactin levels and suggests a source of shared variance between the amygdalohypothalamic processes that affect the release of this hormone and this specific class of experiences.

A combination of (a) elevated corticotrophin due to grief, (b) suppression of nocturnal melatonin levels, (c) normal decreases in melatonin before normal dreams, and (d) the geomagnetic trigger would strongly encourage the experience. The net sudden decrease in microseizuring threshold could also be sufficient to increase the arousing potential of the pontinegeniculooccipital spikes that precede REM (dream) onset and might contribute to the frequent phenomenological report of "suddenly awakening" (2) immediately before a postmortem apparition. Although these results suggest that these apparitions are an artifact of an extreme state-dependence, the possibility that they are associated with transient, altered thresholds in the ability to detect normally indiscriminable stimuli cannot be excluded.

REFERENCES

1. ARENDT, J. (1989) Melatonin and the pineal gland. In J. Arendt, D. S. Minors, & J. M. Waterhouse (Eds.), *Biological rhythms in clinical practice*. London: Wright. Pp. 184-206.
2. PERSINGER, M. A. (1974) *The paranormal: Part I. Patterns*. New York: M. S. S. Information.
3. PERSINGER, M. A. (1988) Increased geomagnetic activity and the occurrence of bereavement hallucinations: evidence for melatonin-mediated microseizuring in the temporal lobe? *Neuroscience Letters*, 88, 271-274.
4. PERSINGER, M. A., & SCHAUT, G. B. (1988) Geomagnetic factors in subjective telepathic, precognitive and postmortem experiences. *Journal of the American Society for Psychical Research*, 82, 217-235.
5. RANDALL, W., & RANDALL, S. (1991) The solar wind and hallucinations—a possible relation to magnetic disturbances. *Bioelectromagnetics*, 12, 67-70.
6. SNEAD, O. C. (1989) Other antiepileptic drugs: adrenocorticotrophic hormone (ACTH). In R. Levy, R. Mattson, B. Meldrum, J. K. Penry, & F. E. Dreifuss (Eds.), *Antiepileptic drugs*. New York: Raven. Pp. 905-912.

Accepted February 17, 1993.